3. ASSUMPTIONS AND CONSTRAINTS

This section presents the assumptions and constraints that affected this cost/benefit analysis. Assumptions and constraints are categorized as global, are associated with a specific existing Title IV system, or are associated with Project EASI/ED.

Subsection 3.1 presents the assumptions that affected the analysis. Subsection 3.2 presents the constraints that applied to the analysis.

3.1 Assumptions

This subsection presents the global, current system specific, and Project EASI/ED assumptions that affected this analysis.

3.1.1 Global Assumptions

1. For this analysis, the "current systems" comprise:

    - Campus Based Programs System (CBS)
    - Central Database System (CDS)
    - Central Processing System (CPS)
    - Federal Family Education Loan Program (FFELP) System
    - Loan Consolidation System (LCS)
    - Loan Origination System (LOS)
    - Loan Servicing Systems (LSS)(four systems)
    - Multiple Data Entry (MDE) Systems (two systems)
    - National Student Loan Data System (NSLDS)
    - Postsecondary Education Participants System (PEPS)
    - Pell Grant Recipient and Financial Management System (PGRFMS)
    - Title IV Wide Area Network (TIVWAN)

2. Table 3.1.1-1 documents the growth factors for ED's Title IV systems contract costs other than ED staff costs. The growth factor for fiscal year (FY) 1997 was calculated based on the difference between the actual FY 1996 total cost and the FY 1997 estimated total cost of $288 million provided by ED staff. This resulted in a required cumulative growth factor of 55%. To achieve this 55% growth, each individual systems growth factor was adjusted for FY 1997 as shown in Table 4-1.

Growth Factors for Current Systems

	1997	1998	1999	2000	2001
CBS	20%	-0.2%	28.3%	16.1%	8.0%
CDS	80%	-0.2%	28.3%	16.1%	8.0%
CPS	27%	-0.2%	28.3%	16.1%	8.0%
FFELP	60%	-0.2%	28.3%	16.1%	8.0%
LCS	90%	-0.2%	28.3%	16.1%	8.0%
LOS	90%	-0.2%	28.3%	16.1%	8.0%
LSS	90%	-0.2%	28.3%	16.1%	8.0%
MDE-ACT	15%	-0.2%	28.3%	16.1%	8.0%
MDE-INET	15%	-0.2%	28.3%	16.1%	8.0%
NSLDS	54%	-0.2%	28.3%	16.1%	8.0%
PEPS	20%	-0.2%	28.3%	16.1%	8.0%
PGRFMS	30%	-0.2%	28.3%	16.1%	8.0%
TIVWAN	20%	-0.2%	28.3%	16.1%	8.0%

Table 3.1.1 - 1, Growth Factors for Current System

1. FY1996 is the baseline year for establishing current system costs, and FY1996 actuals were used to establish the baseline cost for each component of the current systems.

2. The system life for Project EASI/ED is 8 years (FY2000 through FY2007). The period covered in the cost analysis spans FY1996 through FY2007 to encompass analysis, design, and development activities.

3. Project EASI/ED will be implemented on October 1st, 2000.

4. Recurring costs for personnel only reflect estimated ED staff. Staffing costs were based upon the *U.S. Department of Education, Office of Postsecondary Education, OPE Staffing Pattern Report,* (July 1997). The same number of staff are assumed as are present today.

5. ED personnel costs will grow at an annual rate of 4 percent, compounded yearly.

6. A factor of 19.5 percent was applied to recurring personnel costs to calculate estimated fringe benefits.

7. All contractor personnel costs are covered in support services, a sub-category within recurring costs.

8. Cost data collected from ED staff regarding each component of the current system represent all ED costs and contractor-related costs for operation, maintenance, and enhancement (i.e., task order work) of the existing systems.

9. A discount rate of 7 percent (per OMB guidelines) is applied to outyear expenditures stated in real base FY96 dollars.

10. FY1996 current system costs figures submitted by ED include all FY1996 actual costs for each of the systems.

3.1.2 Current Systems Assumptions

CBS:

1. Recurring costs were allocated to cost categories as follows: Recurring Software - 87 percent, Travel and Training - 5 percent, Supplies - 3 percent, Support Services - 5 percent.

CDS, LOS, LSS:

1. CDS costs were estimated by adding the following cost elements:

- Total CDS FY 96 task orders as reported in the CDSI master FY 96 billing report.
- A $3 million portion of a total of $10 million in FY 96 Schedule C software development costs as directed by PSS.
- Recurring government personnel costs as defined in PSS's OPE FY 96 Staffing Report.
- Key contractor personnel costs for CDS are $1.86 million as per PSS end of year cost summary report for the direct loan system.

2. LOS costs were estimated by adding the following cost elements:

- Total LOS FY 96 task orders as reported in the CDSI master FY 96 billing report.
- A $5 million portion of a total of $10 million in FY 96 Schedule C software development costs as directed by PSS.
- Recurring government personnel costs as defined in PSS's OPE FY 96 Staffing Report.

3. LSS costs were estimated by adding the following cost elements:

- Total LSS FY 96 task orders as reported in the CDSI master FY 96 billing report.
- A $2 million portion of a total of $10 million in FY 96 Schedule C software development costs as directed by PSS.
- Recurring government personnel costs as defined in PSS's OPE FY 96 Staffing Report.
- Key LSS contractor personnel costs are $5 million as per PSS end of year cost summary report for the direct loan system .

CPS:

1. Task Order 1 (Alternate Application Processing Site) funds cover excess capacity required for application processing. Per ED direction, costs for Task Order 1 in FY1997 and FY1998 will be approximately half ($1.3 million) of those for FY1996 ($2.7 million) and are $0 from 1999 to 2007.

FFELP System:

1. Schedule E (Key Personnel) costs are mapped into recurring support services costs, based on the understanding that key contractor personnel are not related to any particular tasking.

NSLDS:

1. Estimated FY1996 software task order costs are $2.4 million. Total actual costs for FY1996 are $22.05 million. This amount, minus the actual values for recurring support and processing (data center) in FY1996, equals $2.4 million. Based on FY1997 budget allocations, the FY1996 amount of $2.4 million was allocated 65 percent to non-recurring software and 35 percent to recurring software.

PEPS:

1. FY1996 recurring hardware and software costs of $67,688 were allocated per ED/PEPS memo of 9/8/97 as follows; hardware, $29,724 and software, $37,964. Additionally, because PEPS' personnel specified FY97 and FY98 anticipated costs in the same memo, no growth factors were applied to previous fiscal years to generate the FY97 and FY98 numbers.

PGR/FMS:

1. Only six months of costs for recurring travel (i.e., Task 2 - Recurring Travel and Conference Support) for FY 1996 were provided. This amount was doubled to achieve Task 2's contribution to the annual figure for recurring travel costs for FY 1996.

2. Task 8 (Requirements Analysis and Development Planning), is missing February 1996 costing data. All other eleven months of data were provided. The eleven month average was calculated and used for February 1996. The total for Task 8 was then mapped to non-recurring support services.

3. Per ED direction, Task 7 (PC S/W Improvement) was assumed to be $34,744 for all twelve months of FY 1996.

4. Per ED direction, Firm Fixed Price (FFP) Non-Task Order Deliverables were assumed to total $175,536 for each of the months June, July, and August FY 1996 since data was not provided for these months.

3.1.3 Project EASI/ED Assumptions

1. Project EASI/ED hardware and software acquisition costs will be allocated in FY1998(15 percent), FY1999(45 percent), and FY2000(40 percent).

2. ED staffing will remain the same as is currently supporting Title IV systems.

3. Software development costs were estimated using a combination of bottom-up and analogous approached that provide techniques for estimating large engagements during early phases.

   The following equation was used to estimate Project EASI/ED software development costs:

   Total Development Costs = (Analysis +DES +CON + DBConv + INT) (1+ mgmt), where

   DES = design which is 0.85*Analysis
   CON = construction which is 1.5*Analysis
   DBConv = Database conversion and parallel processing costs
   INT = number of interfaces to and from Project EASI/ED system identified in DFD

mgmt = 0.15, representing a 15 percent management overhead

Figure 3-1 below shows the application of the above equation to Project EASI/ED.

Project EASI/ED Software Development Costs

Labor hours per person-month	166	hours/person-month
Labor Rate per person-month	$16,667	$2M/(6mo*20 persons)
Labor Rate per person-hour	$100	cost/person-hour

Total Development Costs = (Analysis +0.85*Analysis +1.5*Analysis + DBConv + INT) (1+ .15)

Analysis		
Project EASI Information Strategy Plan	$400,000	
Project EASI Concept Doc & Program Management Plan	$200,328	
Project EASI Requirements Support	$2,596,027	
Project EASI Integration Spt	$5,418,340	
Travel	$75,000	
Subtotal	$8,689,695	
Design	$7,386,241	0.85*Analysis
Construction	$13,034,543	1.5*Analysis
DBConv	$952,964	Use labor rate from above
	9491.517832	Database Conversion = F*(1+nl(A)/2) * 300 hours
	16	F= (number of current systems to be converted)
	7	Average age of 16 current systems
	1.954799096	natural logarithm of 7
Interfaces	$6,024,096	Use labor rate from above
	60000	Number of interfaces * 200 hours
	300	Number of interfaces to and from target system identified in BARD
ACTIVITIES TOTAL	$36,087,538	
ACTIVITIES+MANAGEMENT	**$41,500,669**	15% Overhead for Management

Figure 3 - 1, Project EASI/ED Software Development Cost Estimate

4. Capital investment costs for hardware and system software reflect the distributed processing, distributed data with replication for publication framework architecture recommended in the *Project EASI/ED TVTA Report* (August 1997).

5. Using the current systems as an analogous system, travel and training costs were estimated at 13 percent of personnel costs. For the first year, it is assumed that training will be extremely heavy, so an additional $2,000,000 was added. This comes to a total of $2M + (13 percent x $2,805,988) or $2,387,093 as shown in Appendix I, Table I-1 for Recurring Travel and Training.

6. Beginning in FY 2000, equipment costs were estimated as a percentage of support services. The current systems equipment costs are 1.2 percent of support services costs. This same percentage is used for Project EASI/ED. Therefore, with support services costed at $55,085,556, 1.2 percent = $684,108 per year, monthly equipment costs are $57,009. Assuming that the system will be operation for 3 months in FY 2000, this comes to $171,033, as shown in Appendix I, Table I-1 for Recurring Equipment.

7. Beginning in FY 2000, SW costs were estimated as a percentage of support services. The current systems software costs are approximately 10 percent of support services costs. This same percentage is used for Project EASI/ED. Therefore, with support services costed at $55,085,556, 10 percent = $5,667,092 per year, monthly SW costs are $472,257. Assuming that the system will be operation for 3 months in FY 2000, this comes to $1,416,772, as shown in Appendix I, Table I-1 for Recurring Software.

8. Support services costs for Project EASI/ED were derived by analogous estimating methods. Since Project EASI/ED will have a large relational database management system at the core of its operations, it is assumed that it's database transaction costs will be comparable to those of NSLDS. NSLDS is a data repository that is designed to track loan and grant data, to serve as a research database, and to support functions such as prescreening of aid applicants for eligibility and student enrollment status.

   As such, NSLDS accommodates a large number of transactions that are database operations involving the retrieval, insertion, update, and deletion of data. NSLDS is an online transaction processing system and is typical of the type of system that would be employed in Project EASI/ED. Additionally, other services besides database management will be inherent in Project EASI/ED. Below are the additional services required and the name of the corresponding current system whose costs were used to estimate these functions. This is a rough but at this early stage is based on the only data available.

   1. CDS - includes services such as processing Direct Loan payments, maintenance of the Direct Loan lockbox, processing decision support, and processing subsidiary ledger
   2. CPS - includes processing of FAFSA, SAR, mailing, and so forth
   3. FFELP - includes the current system cost of providing debt collection services
   4. LSS - includes customer service
   5. MDEACT - includes imaging processing
   6. MDEINET - includes imaging processing
   7. TIVWAN - includes networking capability

   The cost of these additional seven systems would be added to those of NSLDS to produce a total support services cost. The following table shows how support services costs were determined.

Current Systems	Year 2000 Support Services Costs	Portion Allocated to Project EASI/ED	Yearly Percentage Reduction	8 Year Life Cycle Cost	Life Cycle Percentage Reduction
CBS	$71,181	$0			
CDS	$7,499,887	$7,499,887			
CPS	$25,633,288	$25,633,288			
FFELP	$38,469,394	$11,540,818			
LCS	$14,966,924	$0			
LOS	$56,563,495	$0			
LSS	$94,697,610	$94,697,610			
MDE-ACT	$21,207,280	$21,207,280			
MDE-INET	$16,546,646	$16,546,646			
NSLDS	$39,211,868	$39,211,868			
PEPS	$425,228	$0			
PGRFMS	$5,630,553	$0			
TIVWAN	$4,004,828	$4,004,828			
Total Current Systems	**$324,928,182**			**$3,870,421,762**	
Project EASI/ED		**$220,342,225**	**32.2%**	**$2,178,441,531**	**43.7%**

Table 3.1.3 - 1, Support Services Calculation for Project EASI/ED

9. Each Project EASI/ED subject area, and each function within each subject area, is allocated a percentage of total Project EASI/ED functionality. These allocations are based on an analysis of the likely changes in distribution of costs between the current systems and Project EASI/ED. Table 3.1.3-2 presents the percentage of Project EASI/ED functionality allocated to each subject area and function, and the rational for those allocations.

Funct. No.	% Alloc	Project EASI/ED Subject Areas and Functions	Rational
	16	**INFORMATION SHARING**	There will probably exist substantial savings in going from a TIVWAN VAN configuration to a public network configuration. However, Project EASI/ED will perform more information sharing functions than before.
1	16	Interactive Student and Aid Organization Accounts	
	33	**APPLICATION**	Savings from more efficient processing over a public network will be offset by increased functionality, eligibility and error checking.
2	20	Interactive Application Processing and Renewal	This function processes the greatest number of transactions 6 Million + corrections.
3	2	Pre-Enrollment Financial Aid Simulation Modeling	This function does not actually do much processing or record much data. This activity is generally a content provider.
4	11	Multi-Year Promissory Note Processing	This function will include a new activity that will require additional processing to link several disbursements to one promissory note.
	17	**DISBURSEMENT**	The allocation within Project EASI/ED is about the same. Some enhanced processing such as common aid origination offset by student authorization and consolidation assistance. Enrollment tracking still performed though more consistently.
5	2	Common Aid Origination	The scope of this task will remain constant. More editing will be accomplished, but, this is offset by reduced processing due to standardized origination records.
6	1	Interactive Participant Disbursement Authorization	This new activity simply involves the student granting authorization to Project EASI/ED for disbursements.
7	2	Draw Down School Disbursement Authorization	The number of draw down disbursements will decrease as schools choose to use either the invoice or scheduled method of disbursements.
8	3	Invoice and Schedule Disbursement Authorization	Certain schools will choose to use the invoice or scheduled method for disbursement. The invoice method will allow schools to split disbursements between the school and the students, at each school's discretion. Schools using this option would be relieved of cutting checks.
9	1	Disseminate School Disbursement Information	The scope of this activity will remain relatively constant since lenders and

Funct. No.	% Alloc	Project EASI/ED Subject Areas and Functions	Rational
			guarantors are now sending disbursement information to schools.
10	1	Perform Draw Down Reconciliation	Since schools will be required to submit origination or disbursement records before the funds have been distributed to the students, the amount of reconciliation should decrease.
11	1	Fund Source Disbursement	This activity will increase slightly because ED will calculate the AEA for the lender and guarantors as a verification of the invoices that it will receive.
12	1	State Authorization Management	This new activity does not involve a large number of state grants. However it will contribute to additional costs for the system.
13	1	Consolidation Processing	The system will do more automatic processing for loan consolidation on behalf of the student. This includes requesting and transmitting loan verification data.
14	4	Enrollment Tracking and Reporting	The scope of this activity will increase because Project EASI/ED will track enrollment of all enrolled students, not simply students that have applied for student financial aid.
	24	**REPAYMENT**	The system will most likely experience a general decrease in costs overall. This reduction in costs is due to interactive change in business information increasing overall efficiencies. This is offset by automatic deferment notices and automatic initiation of deferments.
15	5	Repayment Option Modeling and Selection/Repayment Counseling	Repayment option modeling is an additional activity that will increase the function costs in the system.
16	6	Customer Service Management	Project EASI/ED is more customer-focused and this activity will increase in scope.
17	10	Repayment Maintenance	Repayment maintenance will most likely experience a general decrease in costs overall. This reduction in costs is due to interactive change in business information increasing overall efficiencies. This is offset by automatic deferment notices and automatic initiation of deferments.
18	3	Defaulted Debt Collection	The amount of work associated with this activity should decrease due to the increased focus on editing of origination records and increased skip-tracing ability with the integrated database system.
	5	**PROGRAM MANAGEMENT and OVERSIGHT**	Slight decrease in overall costs due to more efficient program, aid organization, and FISAP processing on the front end.
19	2	School Eligibility and Data Maintenance	Because Project EASI/ED is an event-driven system, data on schools is collected as

Funct. No.	% Alloc	Project EASI/ED Subject Areas and Functions	Rational
			various events occur throughout the life cycle of students receiving aid.
20	2	Guarantor and Lender Information Maintenance	Because Project EASI/ED is an event-driven system, data on lenders and guarantors is collected as various events occur throughout the life cycle of students receiving aid and lenders and guarantors servicing loans.
21	1	Program Data and Performance Information Management	This function has the additional activity of responding to student's request concerning programs, schools, lenders, guarantors, and so forth.
	5	**ACCOUNTING**	Though the amount of processing will be relatively consistent to that experienced today, the level of integration of that processing will be increased.
22	5	Integrated Accounting Management	

Table 3.1.3 - 2, Percent Allocations for Functions and Subject Areas Across Project EASI/ED

10. Non-recurring hardware and software costs for FY2001 are estimated to be 8 percent of original hardware and software acquisition costs. This 8 percent figure ($1,235,377) is divided into 40 percent equipment costs ($494,151) and 60 percent software costs ($741,226). The costs for FY2002 - FY2007 are calculated by inflating the FY2001 figures by a system growth factor of 8 percent.

Project EASI/ED Outyear Non-Recurring Costs	Year 2001
Equipment:	$427,277
Software:	$640,916
Portion of Acquisition Cost:	$1,068,193
% of Total Acquisition::	8%
Total Acquisition Cost:	$13,352,412

Table 3.1.3 - 3, Calculation for Non-Recurring Project EASI/ED Outyear Costs

3.2 Constraints

This subsection presents the global and current system constraints that applied to the cost/benefit analysis.

3.2.1 Global Constraints

1. The *Project EASI/ED C/BA Report* evaluates the relative costs and benefits of requirements documented in the *Project EASI/ED BARD*. Decisions regarding a detailed Project EASI/ED technical architecture (i.e., hardware, software, telecommunications), support services requirements and strategies, and implementation options (e.g., outsourcing, COTS software, custom development) have not been made.

2. Recurring systems costs for the Title IV systems reflect the current configuration and do not reflect the proposed Band Strategy that ED is adopting.

3.2.2 Current Systems Constraints

CDS, LCS, LOS, LSS:

1. No cost data from the new LCS, LOS and CDS contractor EDS Inc. was supplied.